Spike-S1-Fc (D614G)

Soluble SARS-CoV-2 Spike S1 (G614-variant) protein fused to a human IgG1 Fc tag

Catalog code: fc-sars2-s1g

https://www.invivogen.com/sars2-spike-s1-proteins

For research use only, not for diagnostic or therapeutic use

Version 20L04-NJ

PRODUCT INFORMATION

Contents:
- 50 µg of lyophilized Spike-S1-Fc (D614G) protein
- 1.5 ml endotoxin-free water

Protein construction:
Codon-optimized spike glycoprotein S1 domain [V16-R685] with a C-terminal human IgG1 Fc tag

Accession sequence: YP_009724390 (native sequence)

Species: SARS-CoV-2 (2019-nCoV); Wuhan-Hu-1 (D614) isolate with D614G variation

Tag: C-terminal human IgG1 Fc

Total protein size: 920 a.a. (secreted form)

Molecular weight: ~126 kDa

Purification: Protein A affinity chromatography

Purity: >95% (SDS-PAGE)

Formulation:
0.2 µm filtered solution in a sodium phosphate buffer with glycine, saccharose, and stabilizing agents

Storage:
- Product is shipped at room temperature. Store lyophilized product at -20 °C. Lyophilized product is stable for at least 1 year.
- Reconstituted protein is stable for 1 month when stored at 4°C and for 1 year when aliquoted and stored at -20 °C. Avoid repeated freeze-thaw cycles.

Quality control:
- The size and purity of the protein has been confirmed by SDS-PAGE.
- Spike-S1-Fc (D614G) has been functionally validated by ELISA using the Anti-SARS-CoV-Spike human IgM (clone CR3022).
- Absence of bacterial contamination (e.g. lipoproteins and endotoxins) has been confirmed using HEK-Blue™ TLR2 and TLR4 cellular assays.

BACKGROUND

The SARS-CoV-2 Spike S1 subunit plays a crucial role in the viral entry into the target cell. The S1 subunit features an N-term S1-NTD region and a C-term S1-CTD region. While S1-NTD is thought to mediate sugar-binding, the S1-CTD enables virus binding to ACE2 through the receptor-binding domain (RBD)[1-3]. In its resting conformation, S1 exerts a physical constraint on the Spike fusion subunit[3]. Early in the pandemic, the D614G amino acid mutation was identified within the Spike protein and has rapidly become the dominant variant around the world. The D614G mutation is located at the C-terminus of the S1 domain, near the furin cleavage site[4]. Research is ongoing to understand the exact mechanisms that drive conformation changes in S1 allowing subsequent membrane fusion events. S1 is a candidate for subunit vaccines against SARS-CoVs[5,6].

PRODUCT DESCRIPTION

Spike-S1-Fc (D614G) is a soluble SARS-CoV-2 protein generated by fusing the Spike S1 domain [V16-R685] to a C-terminal human IgG1 Fc tag with a TEV (Tobacco Etch Virus) sequence linker. This fusion protein has a molecular weight of ~126 kDa on an SDS-PAGE gel. Spike-S1-Fc (D614G) has been generated by recombinant DNA technology, produced in CHO cells, and purified by protein G affinity chromatography.

APPLICATIONS

- **Vaccination studies:** using combinations of Spike protein antigens and adjuvants.
- **Antibody screening:** finding anti-Spike antibodies that can neutralize the SARS-CoV-2 infection.
- **Inhibitor screening:** finding small molecules, or antibodies able to block the SARS-CoV-2 RBD interaction with the ACE2 receptor.
- **ACE2 cellular expression screening:** in primary isolated cells or transfected cells.

METHODS

Spike-S1-Fc (D614G) resuspension (100 µg/ml)

Note: Ensure you see the lyophilized pellet before resuspension.
- Add 500 µl of endotoxin-free water to the vial and gently pipette until completely resuspended.
- Prepare aliquots and store at -20 °C or 4°C.

TECHNICAL SUPPORT
InvivoGen USA (Toll-Free): 888-457-5873
InvivoGen USA (International): +1 (858) 457-5873
InvivoGen Europe: +33 (0) 5-62-71-69-39
InvivoGen Hong Kong: +852 3622-3480
E-mail: info@invivogen.com

PROTEIN SEQUENCE

M E I K V L F A L I C I A V A E A K P T E L E V N L T T R T Q L P P A Y
T N S F T R G V Y Y P D K V F R S S V L H S T Q D L F L P F F S N V T
W F H A I H V S G T N G T K R F D N P V L P F N D G V Y F A S T E K
S N I I R G W I F G T T L D S K T Q S L L I V N N A T N V V I K V C E F
Q F C N D P F L G V Y Y H K N N K S W M E S E F R V Y S S A N N C T
F E Y V S Q P F L M D L E G K Q G N F K N L R E F V F K N I D G Y F
K I Y S K H T P I N L V R D L P Q G F S A L E P L V D L P I G I N I T R
F Q T L L A L H R S Y L T P G D S S S G W T A G A A A Y Y V G Y L Q P
R T F L L K Y N E N G T I T D A V D C A L D P L S E T K C T L K S F T
V E K G I Y Q T S N F R V Q P T E S I V R F P N I T N L C P F G E V F
N A T R F A S V Y A W N R K R I S N C V A D Y S V L Y N S A S F S T F
K C Y G V S P T K L N D L C F T N V Y A D S F V I R G D E V R Q I A P
G Q T G K I A D Y N Y K L P D D F T G C V I A W N S N N L D S K V G
G N Y N Y L Y R L F R K S N L K P F E R D I S T E I Y Q A G S T P C N
G V E G F N C Y F P L Q S Y G F Q P T N G V G Y Q P Y R V V V L S F
E L L H A P A T V C G P K K S T N L V K N K C V N F N F N G L T G T
G V L T E S N K K F L P F Q Q F G R D I A D T T D A V R D P Q T L E I
L D I T P C S F G G V S V I T P G T N T S N Q V A V L Y Q G V N C T E
V P V A I H A D Q L T P T W R V Y S T G S N V F Q T R A G C L I G A E
H V N N S Y E C D I P I G A G I C A S Y Q T Q T N S P R R A R R T E N
L Y F Q G S G S E P K S S D K T H T C P P C P A P E A E G G P S V F L
F P P K P K D Q L M I S R T P E V T C V V V D V S H E D P E V K F N
W Y V D G V E V H N A K T K P R E E Q Y N S T Y R V V S V L T V L H
Q D W L N G K E Y K C K V S N K A L P A S I E K T I S K A K G Q P R
E P Q V Y T L P P S R E E M T K N Q V S L T C L V K G F Y P S D I A V
E W E S N G Q P E N N Y K T T P P V L D S D G S F F L Y S K L T V D
K S R W Q Q G N V F S C S V L H E A L H N H Y T Q K S L S L S P G K

Green: signal sequence
Purple: stabilizing amino acid sequence
Blue: Spike S1 sequence
G: D614G mutation
Black: TEV cleavage sequence
Red: Human IgG1 Fc sequence

REFERENCES

1. Li F., 2016. Structure, function, and evolution of coronavirus spike proteins. Annu. Rev. Virol. 3:237-261. **2. Li F. *et al.*, 2005.** Structure of SARS coronavirus spike receptor-binding domain complexed with receptor. Science. 309:1864-1868. **3. Walls A.C. *et al.*, 2020.** Structure, function, and antigenicity of the SARS-CoV-2 spike glycoprotein. Cell. 181(2):281-292.e6. **4. Korber B. *et al.*, 2020.** Tracking changes in SARS-CoV-2 Spike: evidence that D614G increases the infectivity of the COVID-19 virus. Cell. 182:1-16. **5. Wang N. *et al.*, 2020.** Subunit vaccines against emerging pathogenic human coronaviruses. Front. Microbiol. 11:298. DOI: 10.3389/fmicb.2020.00298. **6. Padron-Regalado E., 2020**. Vaccines for SARS-CoV-2: Lessons from other coronavirus strains. Infect. Dis. Ther. DOI: 10.1007/s40121-020-00300-x.

RELATED PRODUCTS

Product	Catalog Code
Anti-Spike-RBD-hIgG1	srbd-mab1
Anti-Spike-RBD-hIgG1-HRP	srbd-mab1-hrp
Anti-Spike-RBD-hIgM	srbd-mab5
Anti-Spike-RBD-hIgA2	srbd-mab6
Anti-CoV2RBD-c1-hIgG1	cov2rbdc1-mab1
Anti-CoV2RBD-c2-hIgG1	cov2rbdc2-mab1
hACE2-Fc	fc-hace2
Spike-S1-Fc	fc-sars2-s1
Spike-S1-His	his-sars2-s1
Spike-S1-His (D614G)	his-sars2-s1g
Spike-RBD-His	his-sars2-srbd
Spike-RBD-Fc	fc-sars2-srbd
Nucleocapsid-His	his-sars2-n
Nucleocapsid-Fc	fc-sars2-n
pDUO2-hACE2-TMPRSS2a	pduo2-hace2tpsa
HEK-Blue™ hACE2	hkb-hace2
A549-hACE2	a549-hace2
A549-hACE2-TMPRSS2	a549-hace2tpsa

TECHNICAL SUPPORT
InvivoGen USA (Toll-Free): 888-457-5873
InvivoGen USA (International): +1 (858) 457-5873
InvivoGen Europe: +33 (0) 5-62-71-69-39
InvivoGen Hong Kong: +852 3622-3480
E-mail: info@invivogen.com